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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/799,889	03/15/2004	Masatomo Shibata	Q80440	8332
23373	7590	08/04/2005	EXAMINER	
SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037			PHAM, LONG	
			ART UNIT	PAPER NUMBER
			2814	

DATE MAILED: 08/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No.		Applicant(s)	
	10/799,889		SHIBATA, MASATOMO	
	Examiner		Art Unit	
	Long Pham		2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) 9 and 10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>03/15/04</u> . | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of claims 1-8 in the reply filed on 06/09/05 is acknowledged.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujikura et al. (US publication 2003/0183160) in combination with Kawahara et al. (US patent 6,736,894).

With respect to claims 1, 7, and 8, Fujikura et al. teach a III-V nitride semiconductor substrate or layer comprising a III-V nitride semiconductor single crystal at least in a surface portion thereof, the product of [H] and [D] being 1×10^{25} or less, [H] represents the concentration of hydrogen atoms (the number of hydrogen atoms per cm^3) in a surface portion of said single crystal, and [D] represents a dislocation density (the number of dislocations per cm^2) on a single crystal surface. See fig. 7 and associated text.

With respect to claim 2, Fujikura et al. further teach that the substrate or layer is a self-supported substrate or layer of a III-V nitride semiconductor single crystal. See fig. 7 and associated text.

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With respect 3, Fujikura et al. fail to teach the III-V nitride semiconductor single crystal is hexagonal gallium nitride.

Kawahara et al. teach that hexagonal gallium nitride has low defect-density. See col. 10, lines 15-20.

It would have been obvious to one of ordinary skill in the art of making semiconductor devices to use hexagonal gallium nitride in the structure of Fujikura et al. to attain the above advantage.

With respect to claim 4, Fujikura et al. fail to teach that the substrate surface is a C-plane.

However, the use of substrate having surface in the C-plane is well-known.

With respect to claim 5, Fujikura et al. fail to teach that a surface of mirror-polished.

However, the mirror polishing of a substrate is well-known.

With respect to claim 6, since Fujikura et al. teach a III-V nitride semiconductor single crystal having the product of the concentration of hydrogen and the dislocation density of 1×10^{25} or less, the surface of the substrate or layer would inherently have an arithmetic average roughness Ra of 10 nm or less.

Further with respect to claim 7, Fujikura et al. fail to teach a production lot of plurality of III-V semiconductor substrates.

However, since Fujikura et al. teach a III-V semiconductor substrate or layer having small final dislocation density, it would have been obvious to one of ordinary skill in the art of making semiconductor devices to form a production lot of plurality of III-V semiconductor substrates to obtain a lot that has low dislocation density.

Further with respect to claim 8, Fujikura et al. fail to teach forming an epitaxial layer of a III-V nitride semiconductor crystal on the substrate or layer.

However, the formation of a III-V nitride semiconductor crystal epitaxial layer on a substrate is well-known.

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Long Pham whose telephone number is 571-272-1714. The examiner can normally be reached on M-F, 7:30AM-3:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on 571-272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Long Pham
Primary Examiner
Art Unit 2814

LP